

What is claimed is:

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A method of providing backup service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the method comprising:

receiving information about the status of the group of cable modems from the working CMTS to thereby synchronize the protecting CMTS to the working CMTS;

determining that the protecting CMTS is to take over service to the group of cable modems; and

taking over service to the group of cable modems.

2. The method of claim 1, wherein receiving information involves receiving a synchronization message from the working CMTS.

3. The method of claim 2, wherein the synchronization message includes MAC and IP addresses of the cable modems in the group of cable modems.

4. The method of claim 2, wherein the synchronization message includes DOCSIS parameters for the cable modems of the group of cable modems.

5. The method of claim 1, further comprising updating a database of the protecting CMTS with the received information.

6. The method of claim 1, further comprising: prior to receiving information about the status of the group of cable modems, becoming available to take over service from the working CMTS, wherein the information about the status of the group of cable modems includes an entire set of synchronization data for the group of cable modems from the working CMTS.

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The method of claim 1, wherein receiving information about the status of the group of cable modems comprises receiving a portion of synchronization data for the group of cable modems, and wherein the portion of synchronization data comprises data that has changed since a previous synchronization.

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8. The method of claim 1, wherein the protecting CMTS provides downstream messages to the group of cable modems on the same downstream channel as used by the working CMTS to provide service to the group of cable modems.

5 9. The method of claim 1, further comprising providing service to a second group of cable modems from the protecting CMTS.

10 10. The method of claim 1, wherein the protecting CMTS does not provide service to a second group of cable modems.

11. The method of claim 1, wherein determining that the protecting CMTS is to take over service to the group of cable modems comprises determining that the working CMTS is not responding to the protecting CMTS or is not providing signals to a designated node on the cable network.

15 ~~Sub 12~~ 12. The method of claim 11, wherein determining that the working CMTS is not responding comprises receiving no acknowledgement of a HELLO message within a predefined time after the HELLO message was sent from the protecting CMTS to the working CMTS.

20 13. The method of claim 1, wherein determining that the protecting CMTS is to take over service to the group of cable modems comprises receiving notification from a network node that a downstream signal from the working CMTS is no longer being received.

25 ~~Sub 14~~ 14. The method of claim 13, wherein the network node is a cable modem or an upconverter.

30 15. The method of claim 1, wherein the working CMTS and protecting CMTS are separate CMTS interfaces provided on at least one CMTS chassis.

16. The method of claim 1, wherein service to the group of cable modems is switched from the working CMTS to the protecting CMTS without requiring that the group of cable modems to change their settings.

35 17. The method of claim 1, further comprising sending synchronization information, regarding the group of cable modems, to the working CMTS after the protecting CMTS takes over service to the group of cable modems.

~~Sub 18~~ CMTS apparatus capable of acting as a protecting CMTS on a cable network having a group of cable modems to be serviced by a working CMTS, such that when the working CMTS becomes unavailable, the protecting CMTS can take over service to the group of modems, the CMTS apparatus comprising:

5 one or more processors; and
 a memory,

 wherein at least one of the processors and the memory are configured or designed to receive and store synchronization data from the working CMTS, the synchronization data specifying information about the group of cable modems.

10 19. The CMTS apparatus of claim 18, wherein the CMTS apparatus is a complete CMTS or a portion of a CMTS.

 20. The CMTS apparatus of claim 19, wherein the CMTS apparatus is a line card.

15 21. The CMTS apparatus of claim 18, wherein at least one of the processors and the memory are configured or designed to receive the synchronization data in the form of a synchronization message specifying at least one of addresses and operating statuses of one or more of the cable modems in the group of cable modems.

20 22. The CMTS apparatus of claim 18, wherein at least one of the processors and the memory are configured or designed to periodically send HELLO messages to the working CMTS to confirm that the working CMTS is operating.

25 23. The CMTS apparatus of claim 18, wherein at least one of the processors and the memory are configured or designed to take over responsibility for service to the group of cable modems upon determining that the working CMTS is or will become unavailable to service the group of cable modems.

30 ~~Sub 24~~ 24. The CMTS apparatus of claim 18, wherein at least one of the processors and the memory are configured or designed to service the group of cable modems using a downstream frequency that is identical to a downstream frequency used by the working CMTS.

35 25. A computer program product comprising a machine readable medium on which is provided instructions for providing backup service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and

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having a protecting CMTS available to take over service to the group of cable modems, the instructions comprising:

receiving information about the status of the group of cable modems from the working CMTS to thereby synchronize the protecting CMTS to the working CMTS;

5 determining that the protecting CMTS is to take over service to the group of cable modems; and

taking over service to the group of cable modems.

10 26. The computer program product of claim 25, wherein the instruction for receiving information involves receiving a synchronization message from the working CMTS.

27. The computer program product of claim 25, further comprising instructions for updating a database of the protecting CMTS with the received information.

15 28. The computer program product of claim 25, further comprising the following instructions: prior to receiving information about the status of the group of cable modems, becoming available to take over service from the working CMTS, wherein the information about the status of the group of cable modems includes an entire set of synchronization data for the group of cable modems from the working CMTS.

20 29. The computer program product of claim 25, wherein the instructions provide that the protecting CMTS provides downstream messages to the group of cable modems on the same downstream channel as used by the working CMTS to provide service to the group of cable modems.

25 30. The computer program product of claim 25, further comprising instructions for providing service to a second group of cable modems from the protecting CMTS.

30 31. The computer program product of claim 25, wherein the instructions for determining that the protecting CMTS is to take over service to the group of cable modems comprises instructions for determining that the working CMTS is not responding to the protecting CMTS or is not providing signals to a network node on the cable network.

35 32. The computer program product of claim 31, wherein the network node is a cable modem or an upconverter.

33. The computer program product of claim 1, further comprising instructions for sending synchronization information, regarding the group of cable modems, to the working CMTS after the protecting CMTS takes over service to the group of cable modems.

5 ~~Sub 34~~ CMTS apparatus capable of acting as a working CMTS on a cable network having a group of cable modems to be serviced by the working CMTS, such that when the working CMTS becomes unavailable, a protecting CMTS can take over service to the group of cable modems, the CMTS apparatus comprising:

one or more processors; and

10 a memory,

wherein at least one of the processors and the memory are configured or designed to send synchronization data to the protecting CMTS, the synchronization data specifying information about the group of cable modems.

15 35. The CMTS apparatus of claim 34, wherein the CMTS apparatus is a complete CMTS or a portion of a CMTS.

20 36. The CMTS apparatus of claim 34, wherein at least one of the processors and the memory are configured to send the synchronization data in the form of a synchronization message specifying at least one of addresses and operating statuses of one or more of the cable modems in the group of cable modems.

25 ~~Sub 37~~ 37. The CMTS apparatus of claim 34, wherein at least one of the processors and the memory are configured or designed to send HELLO acknowledge messages to the protecting CMTS upon receipt of a HELLO message from the protecting CMTS.

30 38. The CMTS apparatus of claim 34, wherein at least one of the processors and the memory are configured or designed to send a SWITCH_REQ message indicating that the working CMTS wishes to have the protecting CMTS take over service to the group of cable modems.

35 ~~Sub 39~~ 39. A method of providing working service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the method comprising:

sending synchronization data about the group of modems to the protecting CMTS;

determining that the protecting CMTS should take over service to the group of cable modems;

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notifying the protecting CMTS that it should take over service to the group of cable modems; and
discontinuing service to the group of cable modems.

5 40. The method of claim 39, wherein sending the synchronization data comprises sending a synchronization message containing the synchronization data.

 41. The method of claim 40, wherein the synchronization message includes MAC and IP addresses of the cable modems in the group of cable modems.

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 42. The method of claim 40, wherein the synchronization message includes DOCSIS parameters for the cable modems of the group of cable modems.

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 43. The method of claim 39, further comprising determining that the protecting CMTS has become available to provide service to the group of cable modems, and wherein sending the synchronization data comprises sending information pertaining to all current parameters of the group of cable modems in order to allow the protecting CMTS to provide service to the group of cable modems.

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 The method of claim 39, further comprising determining that a parameter pertaining to at least one of the cable modems in the group of cable modems has changed, and wherein sending the synchronization data comprises sending information pertaining to the changed parameter to the protecting CMTS in order to allow the protecting CMTS to provide service to the group of cable modems.

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 45. The method of claim 39, wherein determining that the protecting CMTS should take over service to the group of cable modems comprises receiving notification from a network node that a downstream signal from the working CMTS is no longer being received.

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 The method of claim 45, wherein the network node is a cable modem or an upconverter.

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 47. The method of claim 39, wherein notifying the protecting CMTS comprises sending a switch request message to the protecting CMTS.

 48. The method of claim 39, wherein the working CMTS and protecting CMTS are separate CMTS interfaces provided on at least one CMTS chassis.

49. The method of claim 39, wherein service to the group of cable modems is switched from the working CMTS to the protecting CMTS without requiring that the group of cable modems to change their settings.

50. The method of claim 39, further comprising receiving synchronization information, regarding the group of cable modems, from the protecting CMTS after discontinuing service to the group of cable modems.

51. A computer program product comprising a machine readable medium on which is provided instructions for providing working service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the instructions comprising:

52. sending synchronization data about the group of modems to the protecting CMTS;
53. determining that the protecting CMTS should take over service to the group of cable modems;
54. notifying the protecting CMTS that it should take over service to the group of cable modems; and
55. discontinuing service to the group of cable modems.

56. The computer program product of claim 51, wherein the instructions for sending the synchronization data comprises sending a synchronization message containing the synchronization data.

57. The computer program product of claim 51, further comprising instructions for determining that the protecting CMTS has become available to provide service to the group of cable modems, and wherein the instructions for sending the synchronization data comprises instructions for sending information pertaining to all current parameters of the group of cable modems in order to allow the protecting CMTS to provide service to the group of cable modems.

58. The computer program product of claim 51, further comprising instructions for determining that a parameter pertaining to at least one of the cable modems in the group of cable modems has changed, and wherein the instructions for sending the synchronization data comprises instructions for sending information pertaining to the changed parameter to the protecting CMTS in order to allow the protecting CMTS to provide service to the group of cable modems.

55. The computer program product of claim 51, wherein the instructions for determining that the protecting CMTS should take over service to the group of cable modems comprises instructions for receiving notification from a network node that a downstream
5 signal from the working CMTS is no longer being received.

56. The computer program product of claim 51, wherein instructions for notifying the protecting CMTS comprises instructions for sending a switch request message to the protecting CMTS.
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57. The computer program product of claim 51, further comprising instructions for receiving synchronization information, regarding the group of cable modems, from the protecting CMTS after discontinuing service to the group of cable modems.

15 **21 Sub 19** 58. A method of providing backup service to a group of network nodes on a network having a working headend device providing service to the group of network nodes and having a protecting headend device available to take over service to the group of network nodes, the method comprising:

20 receiving information about the status of the group of network nodes from the working headend device to thereby synchronize the protecting headend device to the working headend device;

determining that the protecting headend device is to take over service to the group of network nodes; and

25 taking over service to the group of network nodes.

59. The method of claim 58, wherein the network is a wireless network.